

REMARKS

Applicants and Applicants attorney express appreciation to the Examiner for the courtesies extended during the recent interview held on September 12, 2006. Reconsideration and allowance for the above-identified application are now respectfully requested in view of the foregoing amendments and the following remarks. Claims 1 and 5-28 remain pending in the application, wherein claims 1, 11, 12, 20, 23, 25 and 26 have been amended. No claims were added or cancelled by this amendment.

As indicated by the notice of withdrawal of finality mailed August 8, 2006 by the USPTO, the present office action is correctly a non-final action, as it is the first office action issued following the most recent RCE filed May 3, 2006.

As discussed and agreed to during the examiner interview, the amendments to the claims distinguish over Loercks et al. (US 6,096,809), which discloses thermoplastic blends containing thermoplastic starch that is made using a high boiling liquid plasticizer (*e.g.*, glycerol) as discussed in previous amendments. As further discussed, Bastioli et al. likewise discloses the use of thermoplastic starch that is made using a high boiling liquid plasticizer (*e.g.*, glycerin). Bastioli et al. teaches that "[t]he critical quantity of plasticizer, which is preferably glycerin, is generally from 2 to 8% . . . by weight of the starch and the thermoplastic polymer". Col. 2, lines 56-58. The use of the term "plasticizer" in the context of the starch means that the starch becomes thermoplastic. If it were instead intended for the starch to remain a particulate solid filler, no plasticizer or water would be included along with the starch in the extruder where a thermoplastic melt is formed. *See* Examples 1-5, all of which include both "glycerine" and "water" used to melt "Globe" native corn starch. Col. 6, line 18 – col. 7, line 40. Thus, the claims as amended distinguish over Bastioli et al. for the same reason they distinguishes over Loercks et al. since Bastioli et al. discloses thermoplastic starch made using a high boiling liquid plasticizer such as glycerin.

Moreover, Bastioli et al. fails to disclose or suggest a composition as in claims 1 and 20 that includes both a soft synthetic thermoplastic biodegradable polymer and a stiff synthetic thermoplastic biodegradable polymer. As exemplified in Examples 1-5, Bastioli et al. blends starch and a single biodegradable polymer (*e.g.*, "Tone" or "Ecoflex"). Claim 25 further requires one or more of a specific stiff thermoplastic biodegradable polymer neither taught nor suggested in Bastioli et al.

As was further discussed at the examiner interview, the claims as amended also distinguish over McCarthy et al., which discloses dual polymer blends that include PLA or a PLA derivative and one of various aliphatic polymers or aliphatic-aromatic polymers that differ from the specific aliphatic-aromatic copolyester required in the independent claims as amended (*e.g.*, having a glass transition temperature less than about -30°C ., as taught at page 25, line 21 and page 27, lines 6 and 12). As discussed in the application and exemplified by the examples, aliphatic-aromatic copolyesters having properties exemplified by ECOFLEX and EASTAR BIO yield polymer blends that have the best mechanical properties of *e.g.*, strength and elongation. Application, page 7, lines 14-17; page 26, line 14 – page 27, line 15; Examples 1-6, 8-61. All but one of the examples includes one or more of ECOFLEX or EASTAR BIO owing to their superior properties. The application further teaches that blending ECOFLEX and a stiff biodegradable polymer yields the surprising and unexpected result that the blend has higher elongation and break stress than either polymer by itself. Page 7, line 24 – page 8, line 2. Figures 1-9.

Because aliphatic-aromatic polymers having properties exemplified by ECOFLEX yield blends having unexpected results, that fact alone overcomes the *prima facie* obviousness rejection over McCarthy et al., which neither teaches nor suggests the use of ECOFLEX, EASTAR BIO or any other aliphatic-aromatic copolyester having a glass transition temperature (*i.e.*, less than about -30°C .) and other physical properties similar to these polymers. In fact, McCarthy et al. is completely silent with regard to the importance of selecting polymers having any particular glass transition temperature. Because McCarthy et al. fails to even recognize the glass transition temperature of an aliphatic-aromatic copolyester as a result-effective variable, McCarthy et al. cannot be understood as teaching or suggesting a blend that includes an aliphatic-aromatic copolyester having the claimed glass transition temperature in combination with a stiff biodegradable polymer having the claimed glass transition temperature.

During the examiner interview the examiner argued that the aliphatic polyesters known as BIONELLE has a low glass transition temperature, thus teaching the glass transition temperatures recited in the instant claims. In response, Applicants pointed out that the present application also discloses several purely aliphatic polyesters, including BIONELLE and polycaprolactone, having low glass transition temperatures, but then singles out the aliphatic-aromatic copolyesters ECOFLEX and EASTAR BIO as providing superior blends. Applicants

therefore drew a clear distinction between purely aliphatic polyesters, on the one hand, and aliphatic-aromatic copolyesters such as ECOFLEX and EASTAR BIO, on the other. The latter were found to provide unexpectedly superior properties of strength and elongation when blended with a stiff biodegradable polymer. Applicants further pointed out that, notwithstanding the laundry list of aliphatic polyesters and the brief mention of aliphatic-aromatic copolymers in McCarthy et al., every example in McCarthy et al. includes BIONELLE, not an aliphatic-aromatic copolymer. Thus, absent some express teaching in McCarthy et al. as to the desirability of not only replacing BIONELLE with an aliphatic-aromatic copolyester, but also selecting an aliphatic-aromatic copolyester that specifically has a glass transition temperature or other properties exemplified by ECOFLEX and/or EASTAR BIO, it cannot now be reasonably argued that one of skill in the art would have been motivated to blend a stiff biodegradable polymer with an aliphatic-aromatic copolyester having the claimed glass transition temperature as now recited in each independent claim (*e.g.*, less than about -30°C . as in claims 1, 20 and 23 or less than about 0°C . as in claim 25). For this reason alone, Applicants submit that the claims as amended are patentable over McCarthy et al.

Moreover, while McCarthy et al. discloses aliphatic-aromatic copolymers in which an aliphatic polyester is joined together with up to 50% by weight of an aromatic polyester, McCarthy et al. neither teaches nor suggests an aliphatic-aromatic copolyester formed from 1,4-butanediol, adipic acid, and dialkyl terephthalate as recited in claims 1 and 20. Had McCarthy et al. contemplated the polymer of claims 1 and 20, McCarthy et al. would have mentioned that the aliphatic-aromatic copolyester can be formed from individual 1,4-butanediol, adipic acid, and dialkyl terephthalate units. Instead, McCarthy et al. simply teaches a copolymer "of an aliphatic polyester and up to 50 percent, by weight, of an aromatic polyester, such as terephthalate". Col. 2, lines 42-44 (emphasis added); *see* col. 6, lines 5-12 (which teaches that polyethylene terephthalate, a relatively high glass transition temperature polymer as previously established, can be the aromatic polyester joined with the aliphatic polyester). Joining together a pre-existing aliphatic polyester and a pre-existing aromatic polyester as taught in McCarthy et al. yields a block copolymer. In contrast, forming an aliphatic-aromatic copolyester from individual 1,4-butanediol, adipic acid, and dialkyl terephthalate units yields a statistical or random copolymer in which the aliphatic and aromatic diester units are more evenly dispersed throughout the copolymer. Because McCarthy et al. neither teaches nor suggests a statistical or random

copolymer formed from individual aliphatic and aromatic units, Applicants submit that claims 1 and 20 are further patentable over McCarthy et al. for this additional reason.

Claim 1 was further amended to specify that the aliphatic-aromatic copolyester, in addition to having a glass transition temperature less than about -30°C ., has a melting point greater than about 105°C . This amendment was added to more particularly claim the melting point properties of aliphatic-aromatic copolyesters exemplified by ECOFLEX and EASTAR BIO, as taught in the application at page 27, lines 7 and 13. Applicants point out that the melting points of ECOFLEX and EASTAR BIO exceed the melting points of each of the BIONELLE polymers noted in McCarthy et al., which instead range from $89\text{-}102^{\circ}\text{C}$. Even though Applicants do not believe that the never-mentioned glass transition temperature of BIONELLE has any suggestive value relative to the type of aliphatic-aromatic copolyester that should be used according to McCarthy et al., assuming one were to make this argument, claim 1 as amended rebuts this hypothetical argument as one cannot argue the importance of the omitted glass transition temperatures of BIONELLE, on the one hand, while ignoring the actually mentioned melting points, on the other, which are outside the range specified in claim 1 as amended. In other words, if the inherent but unmentioned glass transition temperature of BIONELLE can somehow lead to the glass transition temperature recited in claim 1, the actually mentioned melting points of BIONELLE lead away from the melting point range of claim 1 with even greater force, since they are actually mentioned. In other words, the PTO cannot simultaneously argue the importance of an unmentioned teaching when rejecting a claim while ignoring an actual teaching that would lead away from the rejection. For yet this additional reason, Applicants submit that the composition of claim 1 is neither taught nor suggested by McCarthy et al.

Claims 20, 23 and 25 were amended to alternatively claim an aliphatic-aromatic copolyester that is "branched rather than linear". This is a property exemplified by ECOFLEX, as taught in the application at page 26, line 19. Nowhere does McCarthy et al. teach or suggest anything regarding polyesters that are "branched", let alone an aliphatic-aromatic copolyester that, in addition to having the claimed glass transition temperature, is also branched. For this additional reason, Applicants submit that claims 20, 23 and 25 are further patentable over McCarthy et al.

In conclusion, Applicant submits that the Application is currently in allowable form. In the event that the Examiner finds any remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview or which may be overcome by examiner amendment, the Examiner is requested to contact the undersigned attorney.

Dated this 15th day of September 2006.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "J M Gynn", is written above the printed name.

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